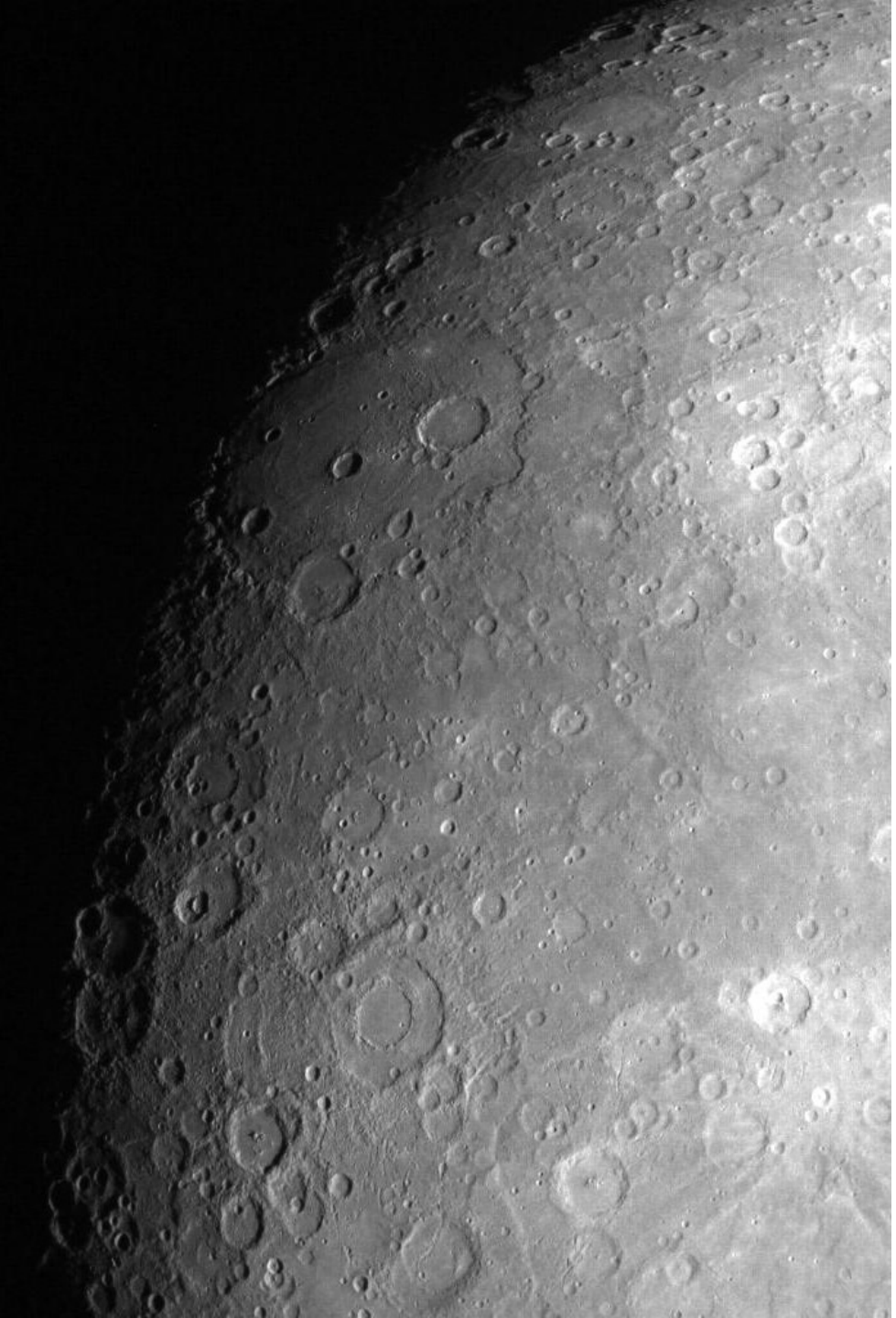
NASA and the Rise of Commercial Space

Brian C. Odom, Ph.D., MLIS

Acting NASA Chief Historian

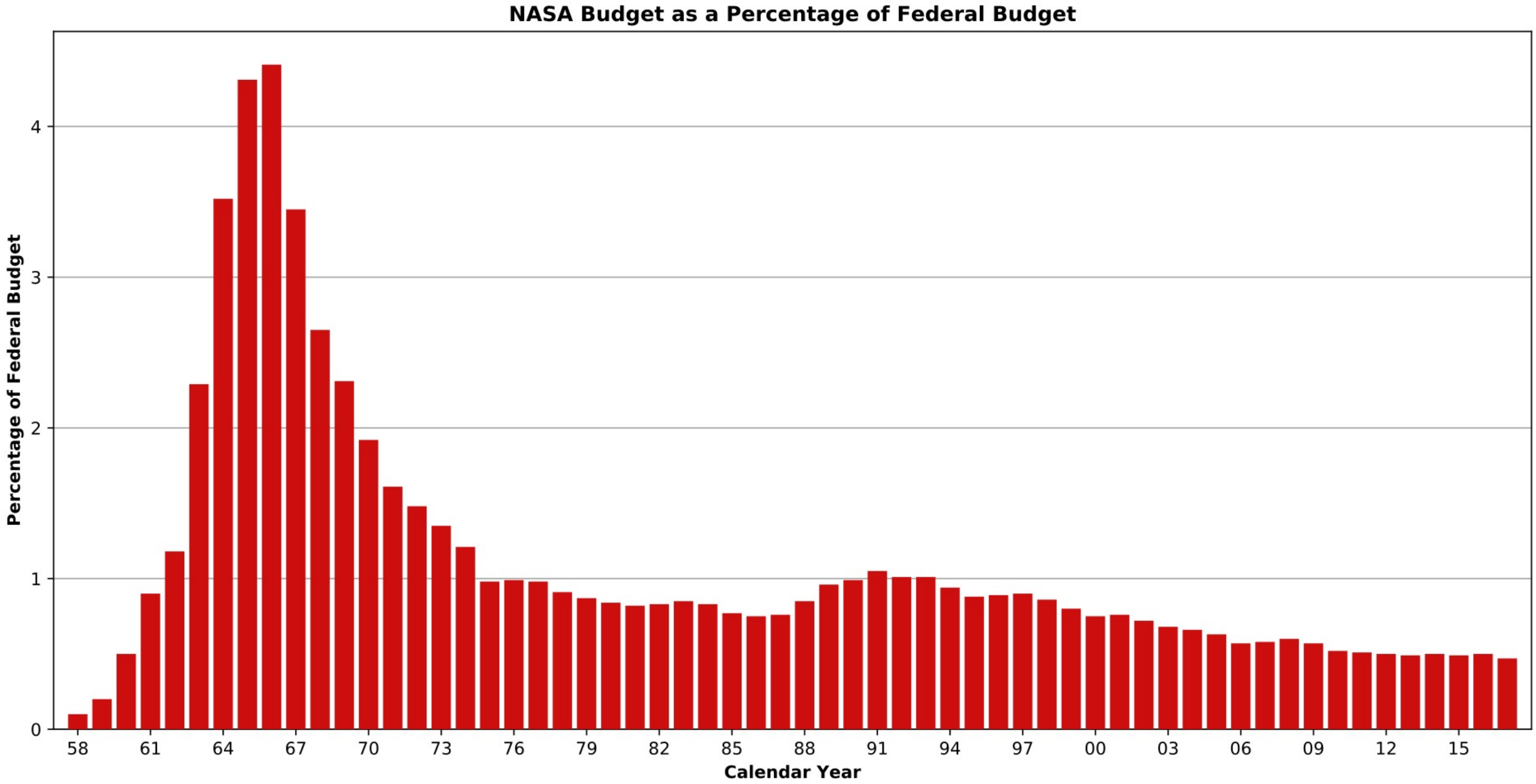


NASA and the Rise of Commercial Space Symposium, March 2021

- Overall Research Question: "What is Commercial Space?"
  - What has it been? What is it now? And what will it be in the future?
- What can history teach us?
- Themes explored
  - **Contextualizing "Commercial Space":** How has the concept of "commercial space" evolved in different fields and disciplines?
  - **Exploring the History of Non-Government Activities:** What have been the major events and milestones in the emergence and evolution of commercial space activities in the U.S. and internationally?
  - **Examining Relevant Government Activities Past and Present:** How has the U.S. Government assisted or impeded the emergence and evolution of the commercial space activities?
- Presentations - Website

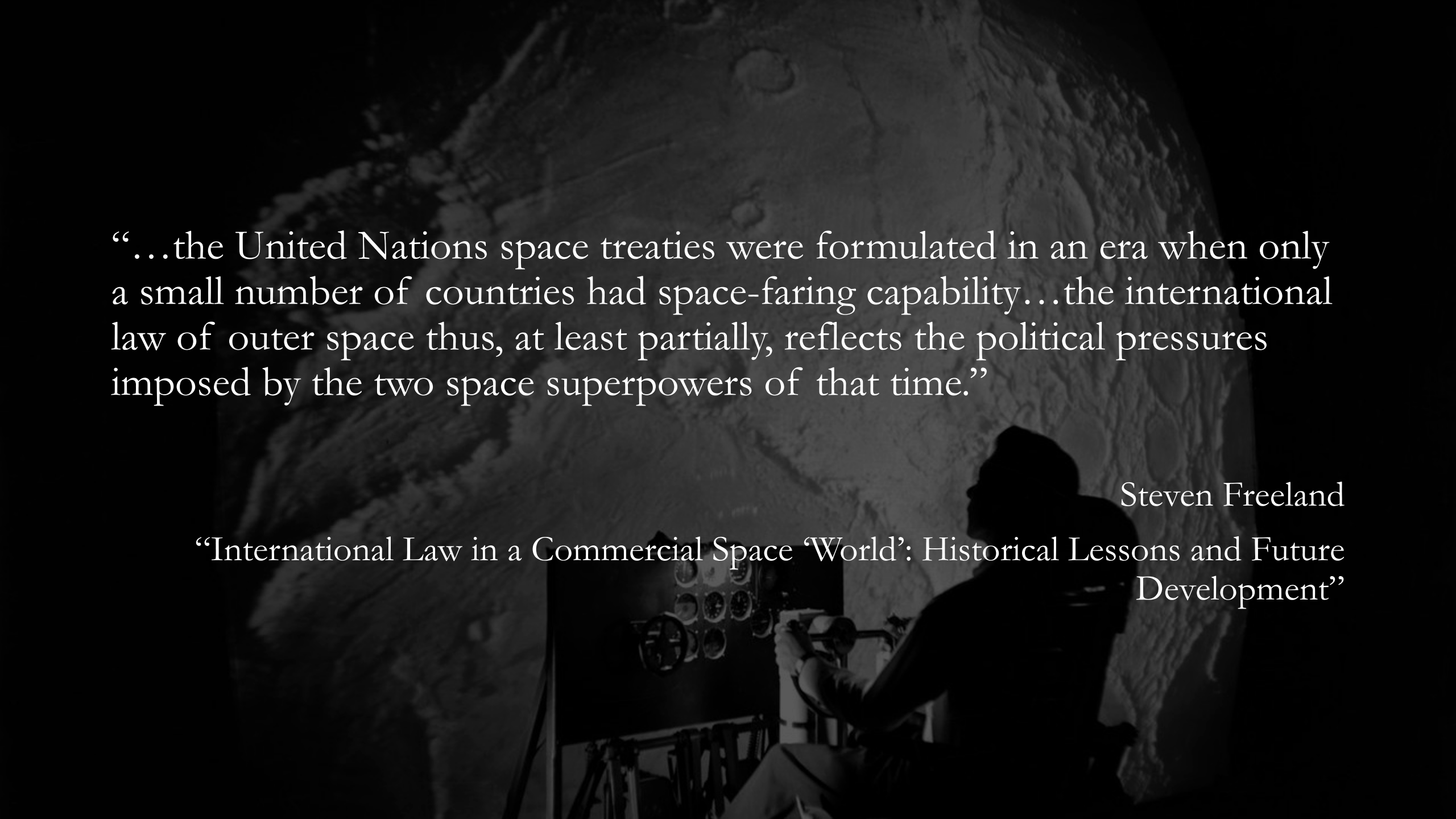
Space Race Paradigm, 1957-1969

- NACA model (1915-1958)
  - Government led R&D
- Cold War Context
  - Military's Arsenal System
- Propaganda, not markets, as prime mover
- Kennedy and Apollo
- Born of DoD concerns
- Transportation paradigm
- Is the US transcontinental railroad a useful analogy?
- Legacy of militaristic vs. peaceful exploration of space


NASA Budget as a Percentage of Federal Budget
Percentage of Federal Budget
0
1
2
3
4
58
61
64
67
70
73
76
79
82
85
88
91
94
97
00
03
06
09
12
15
Calendar Year

Legal Paradigms

- International
  - Challenge of Satellites in orbit
    - Eisenhower and Sputnik (October 4, 1957)
  - United Nations Committee on the Peaceful Uses of Outer Space (1958)
  - Outer Space Treaty of 1967
- Domestic
  - Fragmentation of US space law as it sought to keep pace with the development of space technology and its uses (reactionary development)



"…the United Nations space treaties were formulated in an era when only a small number of countries had space-faring capability…the international law of outer space thus, at least partially, reflects the political pressures imposed by the two space superpowers of that time."

Steven Freeland

"International Law in a Commercial Space 'World': Historical Lessons and Future Development"

"New space legislation from nations with emerging space activities, through the benefit of hindsight, avoid fragmentation by establishing general frameworks around the open category of 'space activities,' which in turns contemplates and accommodates the potential emergence of new space activities in the future. The US system on the other hand needs updating and expanding each time that a new category of activity needing authorization emerges and does not clearly fit into a previously developed framework."

P.J. Blount

"The Historical Fragmentation of US Space Law"

Communications and Remote Sensing Data

- Example of Telecommunications
  - John R. Pierce and AT&T's Bell Telephone Laboratories (1959)
  - Satellite Communications Act of 1962
- Landsat Commercialization (1979-1992)
  - Carter Administration
  - Land Remote Sensing Commercialization Act of 1984
  - Land Remote Sensing Policy Act of 1992
  - Question of Competitiveness vs. National Security

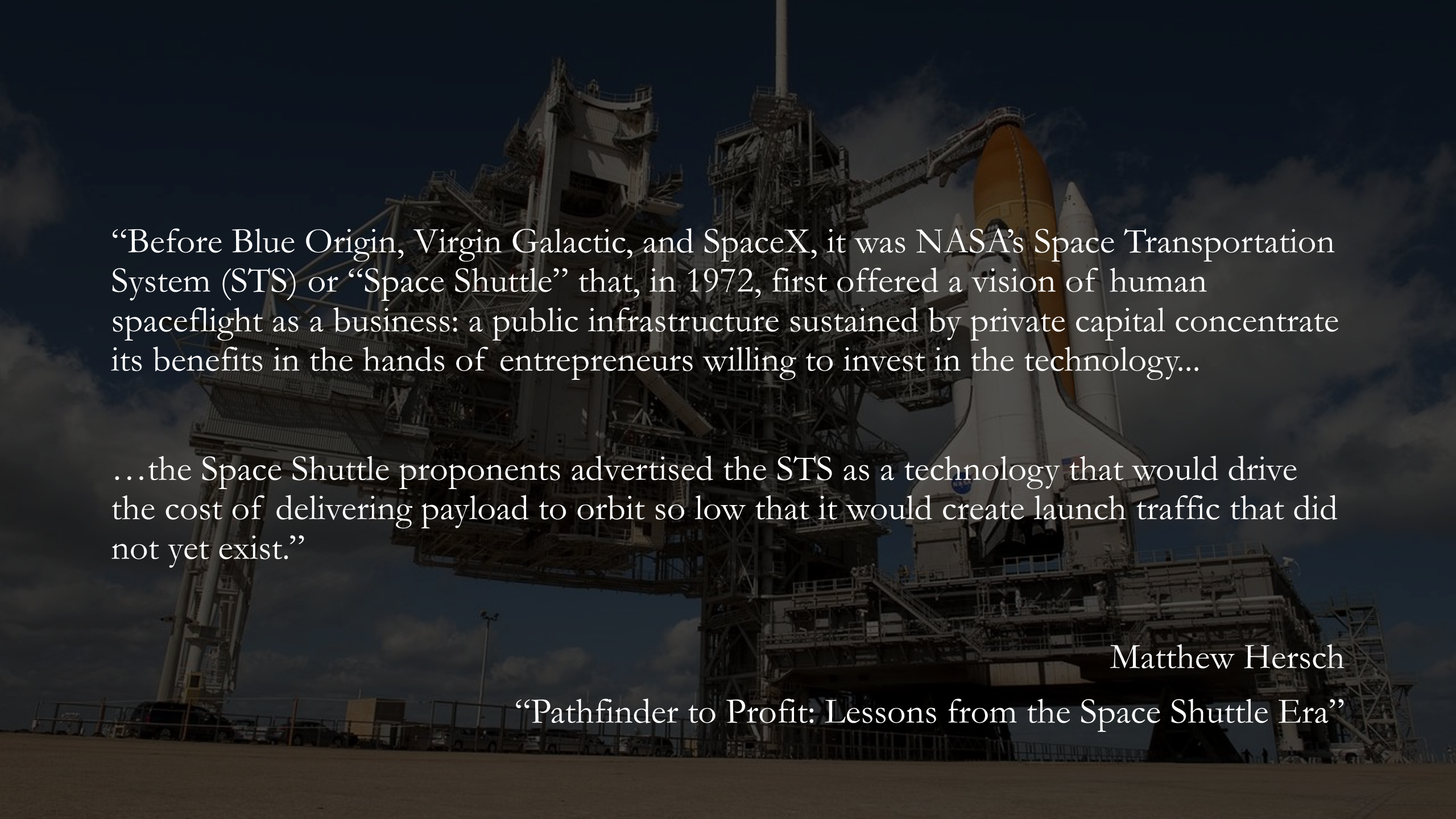
"Commercial spaceflight is not simply an ontologically given sector of the aerospace establishment but rather, in the context of the United States, a highly contested policy-making process driven and shaped by Presidential and Congressional priorities, national security imperatives, and market growth and competition."

Brian Jirout

"The Politics of Commercialization and the Near Collapse of the Landsat Civil Remote Sensing Program, 1978-1992"

Age of the Space Shuttle, 1972-2011

- Access Paradigm
- Promise of Routine Access to Space
- Unsustainable/Unrealistic Expectations of Satellite Proliferation and Other Markets
- Government Assumption of Risk
- Single-Stage-To-Orbit
  - Dan Goldin and ”Faster, better, cheaper”
  - X vehicles – X-33/34 and DC-X
  - Technology Development Programs
    - Fastrac Engine and Merlin 1-A



"Before Blue Origin, Virgin Galactic, and SpaceX, it was NASA's Space Transportation System (STS) or "Space Shuttle" that, in 1972, first offered a vision of human spaceflight as a business: a public infrastructure sustained by private capital concentrate its benefits in the hands of entrepreneurs willing to invest in the technology...

…the Space Shuttle proponents advertised the STS as a technology that would drive the cost of delivering payload to orbit so low that it would create launch traffic that did not yet exist."

Matthew Hersch

"Pathfinder to Profit: Lessons from the Space Shuttle Era"

Infrastructure in Low-Earth Orbit

- International microgravity research station in low-Earth orbit
- What's the Market?
- Commercial Crew Program (2011-)
  - Cancellation of Constellation Program (Ares I and V)
  - NASA, SpaceX, Boeing
  - Is this commercial space?

Rhetoric of Government Policy

President Ronald Reagan

"The US government shall not preclude or deter the continuing development of a separate, non-governmental Commercial Space Sector…shall not conduct activities with potential commercial applications that preclude or deter Commercial Sector space activities except for national security or public safety reasons. Commercial Sector space activities shall be supervised or regulated only to the extent required by law, national security, international obligations, and public safety."

Presidential Directive on National Space Policy, February 11, 1988

President Barack Obama

"The term "commercial," for the purposes of this policy, refers to space goods, services, or activities provided by private sector enterprises that bear a reasonable portion of the investment risk and responsibility for the activity, operate in accordance with typical market-based incentives for controlling cost and optimizing return on investment, and have the legal capacity to offer these goods or services to existing or potential nongovernmental customers."

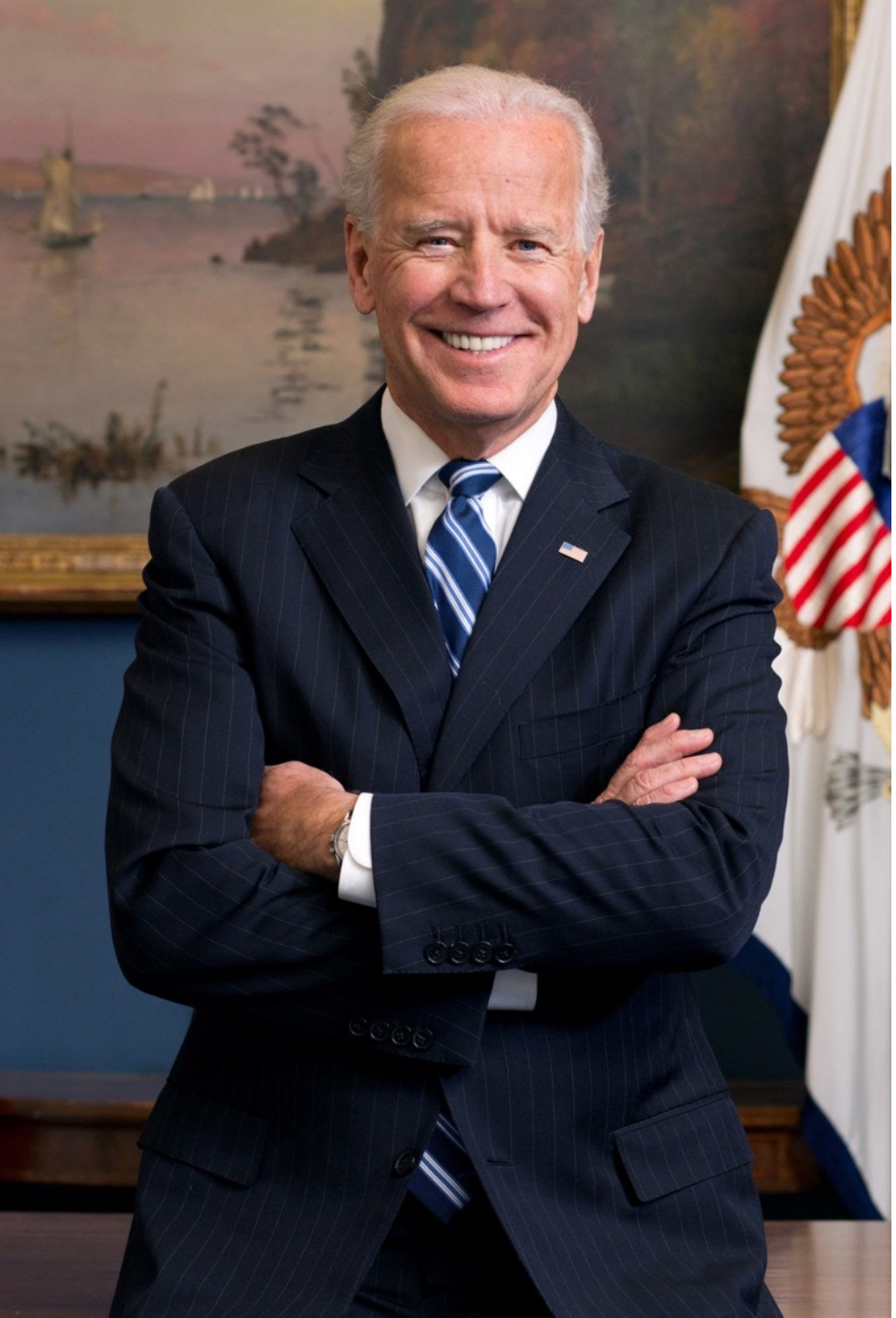
National Space Policy, June 28, 2010

- Summed up by language of the Space Resource Exploration and Utilization Act of 2015:
  - (1) facilitate the commercial exploration and utilization of space resources to meet national needs;
  - (2) discourage government barriers to the development of economically viable, safe, and stable industries for the exploration and utilization of space resources
  - (3) promote the right of United States commercial entities to explore outer space and utilize space resources

President Donald Trump

"A robust, innovative, and competitive commercial space sector is the source of continued progress and sustained United States leadership in space. The United States remains committed to encouraging and facilitating the continued growth of a domestic commercial space sector that is globally competitive, supports national interests, and advances United States leadership in the generation of new markets and innovation driven entrepreneurship."

National Space Policy, December 9, 2020



President Joseph Biden

"To facilitate the growth of U.S. industry and support the creation of American jobs, the United States will clarify government and private sector roles and responsibilities and support a timely and responsive regulatory environment. U.S. regulations must provide clarity and certainty for the authorization and continuing supervision of non-governmental space activities, including for novel activities such as on-orbit servicing, orbital debris removal, space-based manufacturing, commercial human spaceflight, and recovery and use of space resources."

US Space Priorities Framework, December 2021

Current Paradigm(s)

- United Launch Alliance (ULA)
  - Shrinking market causes consolidation?
  - Commercial?
- Artemis Program
- What's the Market?
- Commercial Lunar Payload Services (CLPS)
  - Apollo for Commercial Sector? (Transportation Paradigm)
- Artemis Accords
  - Legal Framework? (No)

Writing and Preserving the History of Commercial Space

- To Boldly Preserve - Website
  - Goal: *"To promote the robust and comprehensive collection and preservation of their history among all actors in space exploration and exploitation."*
  - Funding from National Science Foundation
- Primary Questions
  - How can historians and archivists:
    - Convince the sharply expanding space industry community of the importance of collecting and preserving their history?
    - Work with retiring generations of spaceflight related researchers, engineers, technicians, administrators and users to record their stories?
    - Harness new forms of electronic communication to capture contemporary events and ensure they can be accessed in the future?

Contact Information

Brian C. Odom, Ph.D., MLIS
Acting NASA Chief Historian
Brian.c.odom@nasa.gov
256-541-8974